

WHAT IS CLAIMED IS:

1. A multicoat system comprising

5 (I) at least one constituent (IA) which consists of or comprises mesomorphic polyelectrolyte complexes and which can be prepared by

I.1) reacting, in a liquid phase (IB),

10

I.1.1) at least one polymeric and/or oligomeric, organic, anionic polyelectrolyte (IC) with at least one polymeric and/or oligomeric, organic, cationic polyelectrolyte (ID) and/or at least one cationic surfactant (IE)

15

or

20

I.1.2) at least one polymeric and/or oligomeric, organic, cationic polyelectrolyte (ID) with at least one anionic surfactant (IF)

25

in a stoichiometric or non-stoichiometric ratio,

I.2) pouring the resulting liquid phase (IG)
onto a substrate or into a mold and

I.3) allowing it to solidify, and

5

I.4) heat-treating the resulting solid (IH);

and

10 (II) at least one coat (IIA) which is three-
dimensionally crosslinked and can be prepared
by

15 II.1) applying at least one aqueous,
thermally curable coating material
(IIB) comprising

II.1.1) at least one binder (IIC) and

20 II.1.2) at least one crosslinking
agent (IID),

to the surface of the constituent (IA), and

25 II.2) thermally curing the resulting wet film
(IIE).

2. A process for producing multicoat systems, in
which at least two constituents are applied one

I.3) allowing it to solidify, and

I.4) heat-treating the resulting solid (IH);

5

and then, on the resulting constituent (IA),

(II) preparing at least one coat (IIA) which is
three-dimensionally crosslinked by

10

II.1) applying at least one aqueous,
thermally curable coating material
(IIB) comprising

15

II.1.1) at least one binder (IIC) and

II.1.2) at least one crosslinking agent
(IID)

20

to the surface of the constituent (IA),
and

II.2) thermally curing the resulting wet film
(IIE).

25

3. A reactive system comprising

(I) at least one constituent (IA) comprising at least one mesomorphic polyelectrolyte complex comprising

5 I.1.1) at least one polmeric and/or oligomeric, organic, anionic polyelectrolyte (IC) and at least one polymeric and/or oligomeric, organic, cationic polyelectrolyte (ID) and/or
10 at least one cationic surfactant (IE)

or

I.1.2) at least one polymeric and/or
15 oligomeric, organic, cationic polyelectrolyte (ID) and at least one anionic surfactant (IF)

and also

20

(II) at least one aqueous, thermally curable coating material (IIB) comprising

II.1.1) at least one binder (IIC) and

25

II.1.2) at least one crosslinking agent (IID).

4. The multicoat system as claimed in claim 1, the process for producing it as claimed in claim 2, or

the reactive system as claimed in claim 3, wherein the mesomorphic polyelectrolyte complexes produced in liquid phase (B), and/or their precursors, are purified by repeated precipitation from a solution and redissolution.

- 5
- 10
- 15
- 20
- 25
5. The multicoat system as claimed in claim 1 or 4, the process for producing it as claimed in claim 2 or 4, or the reactive system as claimed in claim 3 or 4, wherein polyelectrolytes (IC) and (ID) selected are those whose polymer chains (IC) and (ID), viewed independently, would not be compatible but would instead separate again in the solid phase.
 6. The multicoat system as claimed in any of claims 1, 4 and 5 or the process for producing it as claimed in any of claims 2, 4 and 5, wherein the solid (IH) is heat-treated for from 1 minute to 10 hours.
 7. The multicoat system as claimed in any of claims 1 and 4 to 6 or the process for producing it as claimed in any of claims 2 and 4 to 6, wherein the solid (IH) is heat-treated at temperatures between 80 and 300°C.
 8. The multicoat system as claimed in any of claims 1 and 4 to 7, the process for producing it as

claimed in any of claims 2 and 4 to 7, or the reactive system as claimed in any of claims 3 to 5 and 7, wherein the constituent (IA), the coat (IIA) and/or the aqueous, thermally curable coating materials (IIB) comprise additives (J), especially polymers crosslinkers, crosslinking catalysts, initiators, especially photoinitiators, pigments, dyes, fillers, reinforcing fillers, rheological assistants, wetting agents and dispersants, defoamers, adhesion promoters, additives for improving substrate wetting, additives for improving surface smoothness, dulling agents, leveling agents, film-forming auxiliaries, driers, antiskinning agents, light stabilizers, corrosion inhibitors, biocides, flame retardants, polymerization inhibitors, especially photoinhibitors, or plasticizers.

9. The multicoat system as claimed in any of claims 1 and 4 to 8, the process for producing it as claimed in any of claims 2 and 4 to 8, or the reactive system as claimed in any of claims 3 to 5 and 8, wherein the coat (IIA) and/or the aqueous, thermally curable coating materials (IIB) comprise constituents which are curable with actinic light, especially UV radiation, and/or electron beams.

10. The use of the multicoat system as claimed in any of claims 1 and 4 to 9 or of the multicoat system

produced by the process as claimed in any of claims 2 and 4 to 9 as shaped parts and laminates, especially in automobile construction.

5 11. The use of the multicoat system as claimed in any
of claims 1 and 4 to 9, of the multicoat system
produced by the process as claimed in any of
claims 2 and 4 to 9, or of the reactive system as
claimed in any of claims 3 to 5, 8 and 9 in
10 automotive OEM finishing and refinish, in
industrial coating, including coil coating, and in
furniture coating.

12. An article, especially an automobile, coil or
15 furniture, comprising at least one multicoat
system as claimed in any of claims 1 and 4 to 9 or
at least one multicoat system produced with the
process as claimed in any of claims 2 and 4 to 9.